Turley

CHOLERA.

Boy

THE NATURE OF THE POISON,

THE PART OF THE BODY FIRST ATTACKED;

ITS DEVELOPMENT AND SELF-GENERATION IN THE BLOOD;

ITS FIRST EFFECTS ON THE NERVOUS AND VASCULAR SYSTEMS, AND ITS FATALITY THENCE ARISING;

WITH OBSERVATIONS ON OUR MEANS OF DEFENCE AGAINST ITS INFECTION, AND THE SIMPLE AND RATIONAL METHOD OF TREATING THIS

ASIATIC PESTILENCE;

BEING THE SUBSTANCE OF

TWO DISCOURSES,

DELIVERED AT THE GUILDHALL, WORCESTER,

ON THE EVENINGS OF THE 25th & 26th OCTOBER, 1854,

BY DR. TURLEY, F.E.S.,
&c. &c.

(THE SHERIFF OF WORCESTER IN THE CHAIR,)

WITH CORRECTIONS, ADDITIONS, AND ANNOTATIONS, OF THE AUTHOR.

PUBLISHED BY REQUEST OF THE SHERIFF.

WORCESTER:
PRINTED BY FRED: N. GOSLING, JOURNAL OFFICE,
AND MAY BE HAD OF ALL BOOKSELLERS.
PRICE SIXPENCE.

[COPY OF THE SHERIFF'S LETTER.]

My dear Doctor,

From seeing in many of the public journals your Lectures at the Guildhall, on the 25th and 26th October, transcribed, it strikes me that you might publish them advantageously, with perhaps some additional notes. Should you think it well to do so, I trust, for humanity's sake, you will adopt my suggestion.

I remain,

My dear Doctor,

Yours faithfully,

WM. COWELL,

Sheriff of Worcester.

6th November, 1854.

To Dr. Turley.

PREFACE.

The following pages will be found to contain the new views of the Nature and Treatment of the Asiatic Pestilence, promulgated by Dr. Stevens, D.C.L., whose book on "The Blood," published in 1832, produced so great a sensation among the medical philosophers of that day, and called forth the highest eulogiums from Drs. Copland, Ure, Prout, Turner, Thompson, Abernethy, &c. &c. Dr. Stevens was the first person who applied a rational method of arriving at the intrinsic facts or phenomena belonging to this then new disease. He first examined the *blood* of those who had died of Cholera, and found it deficient of its natural salts, thick, and surcharged with carbonic gas. He then chymically tested the excretions of the patients, and he found that the alvine dejections were composed of 98 per cent. of water, and two of solid material; and half of this contained the very salines which were found to be deficient in the serum of the Choleraic blood. He had previously ascertained by experiment that the galvanic pulsation of the heart, *the circulating pump*, could not be maintained by blood, thus deficient of the electric salts. Hence he first showed the asphyxia now so well known as the mode of death in this disease.

Dr. Stevens's inference from these premises was perfectly logical, and his practical deductions equally sound, namely, that the physician's effort in the cure of this disease must be to reintroduce into the blood a fluid, rendered of the same specific gravity as the water of the blood, by the very same salts whose presence characterise the natural serum. Fortunately for his experiment, the thirst and burning heat felt at the pit of the stomach, inducing the patient's desire for fluids, were most favourable for his essay, it being well known, by asparagus and other substances, that the whole body can be permeated by their qualities in two minutes and a half. His success was complete when, in his first case of collapse, he saw the blue colour of the face of the patient change to its natural hue within half an hour of the administration of the remedy.

These facts were patent to many distinguished members of our own profession, who successfully repeated his experiments; and Mr. Brand, the celebrated chemist, declared before the Royal Society that he had satisfied himself of the truth of all the facts advanced by Dr. Stevens, when Dr. Stevens's paper on the blood was read before the College of Physicians on the 3rd May, 1830.

It would seem marvellous, did we not reflect on the early fate of all new pioneers in the march of science, that deductions, so simple, so philosophic, and so important to suffering humanity, should have passed into desuetude before the second arrival of Cholera in this country in 1849, save in the hands of comparatively a few of the medical profession; and the increasing mortality from this disease, viz., from 41 to 50 per cent.,

stamps the culpable neglect of subsequent practitioners and Boards of Health. Up to the present time, the worthy and philanthropic discoverer has unselfishly spent several thousand pounds in fruitless attempts to force a commission of enquiry into the merits of his discovery, by the General Board of Health, the Privy Council, and by the Council of the College of Physicians. But I am persuaded when the intelligence of the public mind shall be exalted, by philosophical truth, and tho' the author be no more, science will signalise his name, and humanity will breathe its blessings o'er his sepulchre.

More prefatory observations I need not make. The substance of the Lectures I had the honour to deliver to so numerous and applauding an audience will be found in the following pages, with such corrections and additional notes, as, it is hoped, may supply the place, to the reader, of the numerous illustrations of which the auditors availed themselves.

It has been well suggested that this small pamphlet should be offered to the public at a price barely remunerative, believing that by a wider diffusion of the facts of Cholera, the simplicity of its treatment, and mode of prevention, the public may cast aside groundless alarm, and be induced to avail themselves of the new philosophical and practical information it is hoped these pages contain, and which I have now the honour to

DEDICATE TO OUR WORTHY SHERIFF,

and those of the Public who kindly lent their aid, by their presence at the delivery of the Discourses, to promote the object which prompted them; namely, the temporary succour of those needy persons whose necessities were created by the removal, by this fatal foe, of friends and relatives on whom their succour and subsistence depended.

E. A. TURLEY.

Ivy House, Nov. 16th, 1854.

CHOLERA,

ITS CAUSES AND TREATMENT,

BEING THE SUBSTANCE OF TWO ORATIONS, TAKEN IN SHORT-HAND BY MR. A. COOKE, REPORTER, OF THIS CITY.

AGREEABLY to previous announcement, at seven o'clock on the evenings of Wednesday and Thursday, October 25th and 26th, 1854. Dr. TURLEY thus addressed large assemblages of the citizens of Worcester, at the Guildhall, (the Sheriff of the city, Mr. COWELL, in the chair,) on the fatal epidemic prevalent in this city. The object of the speaker was to disseminate a more correct view of the disease, its nature and simple treatment, with a view to assuage the panic arising out of so sudden an outbreak of this unexpected pestilence.

Dr. Turley had previously intimated that the proceeds of the Lecture should be devoted to ministering to the temporal wants of those persons, whom the death of their friends, from this dire disease, had plunged into poverty.

The Doctor had most amply surrounded himself by numbers of beautifully-executed diagrams and anatomical preparations, demonstrative of his interesting subject, besides the crystalised salts obtained from the human blood and the artificial salts to be supplied, in beautiful prismatic chrystals, prepared by Mr. Lamplough, to which he made frequent and appropriate reference, thus sustaining the intense interest of his auditory for more than two hours on each occasion.

Among the company present were several members of the Medical, Legal, and Clerical Professions, the Vice-Chairman of the Board of Guardians, and others.

The CHAIRMAN having eulogistically opened the proceedings,

Dr. TURLEY came forward and spoke as follows:—

MR. CHAIRMAN, LADIES AND GENTLEMEN,—I am fully conscious of the arduous task which I have undertaken in attempting to address such an assemblage as the present on the subject of Cholera. The very name carries with it fear, and causes people to be panic stricken; but this dread I hope to be able to remove by the remarks and explanations which I am about to offer. The disease, or affection, referred to is incorrectly termed *Cholera*, which is a compound of two Greek words χολη and ρεω, signifying a flow of black bile. Now, there is no bile in true Cholera cases, for so soon as the medical attendant can induce the presence of bile, his hopes arise in the success of his treatment. It is well known to you, from every-day experience, that things which have not in themselves any danger, are magnified into phantoms of fright and terror by some nervous persons, from want of information as to the physical properties of this dangerous object; a familiar instance of this is afforded in the gun. All of you know what a subject of terror is a gun—and to ladies especially

—who naturally imagine that whether charged or uncharged it is sure to go off. (Laughter.) So it is with respect to the panic fear of Cholera. But to the point. It is my intention in the present lecture, as stated, to speak of Cholera and its treatment; but as I am persuaded, from experience that a good deal of what I shall have to say on this dreadful disease, will not be comprehended by you, without you have some idea of the nervous system, I purpose, first, to describe briefly the VITAL NERVES in the lungs obnoxious to the poison; secondly, to make you fully to comprehend my views of the respiratory organs, and therefore I shall treat of the respiratory cells, and describe the heart, and viscera, which perform the vital chemistry of the intestinal tube, consisting of the stomach, bowels, &c.; and lastly, I shall enter into the treatment of Cholera, including some general remarks on the method of defence against this aërial poison.

Now, before you enter on the consideration of the disease, misnamed Cholera, it is necessary that you know something of the construction of the human body, though in this demonstration it is the *nervous system* principally with which I shall have to deal, and to which I have to beg your attention. In considering this portion of my subject I shall point out how every atom of matter has relation with the "life of the flesh," which, as my old master Abernethy first suggested, is VITAL ELECTRICITY.

It has pleased our Almighty Creator to employ in the construction of the material Universe, four elements, known as oxygen, nitrogen, hydrogen, and carbon; the first two of these seem to belong to what in philosophic language is called, though incorrectly, *positive*, the two latter to *negative* electricity. Now you all have some knowledge of electricity in the flash of the thunderstorm, but few imagine the mighty powers and influence of this agent in conducting all the chymical and vital changes the Almighty is pleased to uphold in the economy of His Universe. If you will take the two opposite wires of a common galvanic battery and place them *together*, they will effect a natural equilibrium—a state of quiescence; but it so happens that any matter placed between these two polar wires—the opposing electric forces, will be analysed into its primitive elements, and these in accordance with the eternal law, will attach themselves individually to whichever pole they naturally belong. Thus the diamond, imperishable though it be, can be dissolved into pure carbonic acid, or oxygen and carbon.

Upon this law are so constituted the two primitive atoms or cells of the nervous system, that one of the atoms or molecules of their matter has a relation to *negative* electricity, whilst the other belongs to, or has an affinity, as it has been called, for *positive* electricity. The *brain* in the head is the reservoir of the *terrestrial* or *positive* electricity, whilst the *central brain* placed *in the body*—the solar ganglion, is the source of negative or vital electricity. Thus constituted we possess two centres of electric force, with the *spiritual* essence of life and its attributes, directing and controlling these mighty engines of the animal machine, in all the zoo-chemical phenomena of corporeal relation, signalising the vital or living creature. Under these influences, then, all the great operations of digestion, respiration, muscular movements, sensation, reproduction, and repair, are conducted. For example, if a particle of food be placed between these two chemical poles in the stomach, it is instantly dissolved, and its elements constrained, according to the instincts of life, to minister to the substance of the parent body. By the same law, also, two different gasses, similarly exposed in the lungs, between these dissolving forces, are directed, according to their natures to perform their distinct offices in the human body.

[Dr. Turley here drew attention to diagrams showing the composition of the human brain, with its white fibres, originating the spinal nerves and their emanations; and the grey matter, placed external to these, which, by its capillary circulation, furnishes the positive or terrestrial electricity to charge the cerebral battery.]

We must keep in mind that it is electricity which forms the bond of friendship or bone of contention betwixt the atoms of all terrestrial matter, whether it be the crystallization of the common salt we eat, the solidity of the rock we tread on, the concretion in a tea kettle, or the material of the bones, which constitute us locomotive machines. Nor does its influence rest here, but its parent, the sun, by its electrical emanation, so polarises, according to their densities, the several planets, that they revolve by physical necessity, or rather by Divine design, round the solar system, of which our globe is but an insignificant planet.

That very law which moulds a tear,
And bids it trickle from its source,
That law preserves the earth a sphere,
And guides our planet in its course.

This may seem a very enlarged, or poetical glance of the constitution of the Universe, but those who read correctly the pages of the Almighty Book of Creation, will find that the microscope only magnifies the smallest objects of matter into the mighty creations of Jehovah's fiat.

I have already hinted to you that the sun, the centre of our planetary system, is the source of electricity;—but whether electricity be *one* element, or more, prior to its reaching the circumambient air, forty-two miles high which surrounds our globe, and then penetrating the two gasses, constituting the atmosphere, and thus inducing the opposite electric state called negative electricity, I do not feel competent to determine, but certain it is that we receive but three rays, the red, blue, and yellow, constituting the light of our solar planet. And even two of these may be ultimately found to be but the products of the two gasses through which the solar rays travel.

Setting aside for the present such speculations, we come at once to the facts I have observed, namely, that the *red ray* belongs to *positive* electricity, oxygen, all acids, and everything called red; whilst the *blue ray* belongs to the *negative* pole, everything blue, and all alkalies. The *yellow ray* belongs, I imagine, to *chlorine*, but of this I do not feel competent to speak positively. A few years hence, I opine, that electricity, light, and caloric, will be found to be identical, or, to say the least, only electrical effects on the properties of gaseous matter. This opinion is upheld by a large assemblage of facts daily accumulating in my mind. I may here mention to you one well known coincidence, namely, that light and electricity travel at the same pace, *e. g.*, about 240,000 miles in a second of time. Also that the combination of the two electric poles on a piece of *carbon* can elicit the most brilliant *solar* light, as we had lately exemplified in London; so that you see by collecting and reviewing the simple laws of matter in their correlation with the economy of nature, how the mind soars from cold *material* philosophy up to the *spiritual* essence of the Great Author of all things.

——— "Spirit of Nature! here,
In this interminable wilderness
Of worlds, at whose immensity
E'en soaring fancy staggers,
Here is Thy fitting temple.
* * * * * *
Almighty spirit! thou!
Imperishable as this scene,
Here is Thy fitting temple.'

You will be pleased to bear in mind that every atom of matter is by the law given to matter, so aranged as to belong to one or the other electricity, so that this law becomes at once the explanation of the theory of attraction and repulsion, chemical affinity, gravity, the laws of crystalization, capillary attraction, endosmos and exosmos, ponderability of matter, heat and cold, fluidity and solidity, growth and decay, vegetation and putrefaction of all animal and vegetable life. To show you, then, how the poison of Cholera is introduced into the blood, it will now be necessary to pass in review the composition of the *atmospheric* air we hourly breathe. This gaseous fluid is composed of twenty-one parts of oxygen and seventy-nine of nitrogen, with a trace of carbonic acid, ozone, &c. Now the two atoms, composing atmospheric air, are of different sizes, densities, and polarity; oxygen being the source of all acids, and nitrogen being only mechanically mixed with, but not chemically united in, the compound. (This was shown by black and white marbles being alternately placed in a goblet, the one kind representing O, the other N, and almost an equal quantity of fine sand, poured into the interstices, formed an exemplification of the law of the solution of more *subtle* particles betwixt, occupying the interspaces of the atoms of *coarser* gases or fluids.)

You are now prepared to comprehend how the finer gases are dissolved in the coarser ones, or finer fluids, called *spirits*, or noxious emanations, called miasms, are dissolved in coarser aqueous liquids. Every one knows that on each inspiration a volume of atmospheric air enters into his chest, and permeates the AIR CELLS constituting the internal surface of the lungs, though few present are prepared to believe that each terminating air tube is surrounded by 17,000 air cells, and that their total number, in healthy human lungs, exceeds 600,000,000, hence unravelled, the air cells would cover a surface of fifty-eight square yards. You will have no difficulty, therefore, in apprehending how easily a noxious or pestilential gas, or the germs of the miasmatic poisons and contagious diseases, can enter into the human blood, especially when you reflect that the fine membrane lining the surface of your little air tubes is continually gorged with venous blood seeking aërial purification.

We have next to consider the interchanges wrought in the inside of the air cells of the lungs by virtue of the *vital* nerves which line them acting on the oxygen and nitrogen of the atmosphere and the carbon and hydrogen of the blood and vapour thence issuing. The blood desires to part with its carbon, which, retained in the body, would *be fatal to life in three minutes*, as we see in hanging, drowning, or by breathing charcoal gas. Now the oxygen, *positive*, and the carbon, *negative*, and acidifiable, instantly combine, by electric and immutable law—a physical necessity—and thus, by their union, elicit both *heat* and *electricity*. The first governs the temperature of warm blooded animals; the electricity, conveyed by means of the iron of the blood, supplies the body with cerebral or *muscular* electricity. But you must not forget that the air cells of the lungs are replete with a net-work of vital nerves, similar to the retina of the eye—derived wholly from the central *vital* nervous system, or seat of life. Now all the alkaloid poisons, such as strychnine, atropine, and digitaline, are noxious to the VITAL NERVES. Thus the functions of life are annihilated *at their source*, Not merely is the chemistry performed in the lungs thus suspended, but the subtle *poison*, self-generating in the serum, or water of the blood, is dissolved and conducted, by the circulatory force, through all the channels of the body, and being thus brought into contact with the nerves lining all the veins, arrests for a time even the decomposition of the natural salts of the blood, which provide the *vital electricity* to the central ganglion of life. (The anatomy of these organs was here described.)

We must next consider vital *instinct*, which is the instinctive knowledge or intelligence, planted in the tree of life to stamp the peculiar economy or characteristic endowments of each of God's created beings, and we must bear in mind that this mighty net-work, emanating from the central ganglion, placed beneath the stomach, and distributed to every organ of the body, becomes the telegraphic messenger, conveying to the *spirit of life* in the tree of life a knowledge of every impression, noxious or beneficial, that can affect it. It thus results that every impression, acting on the most distant fibril of this apparatus, gives notice, with electrical celerity, of all that happens to the body, so that defence, reparation, or destruction, can be instantly called forth, and should the mind's assistance be necessary to effect the life's volition, it has all these powers at command, through the connection of its vital wires, with every posterior branch of every nerve issuing from the holes of the spinal cord, besides its innumerable internal connections with the *cerebral* nerves in the neck, face, and with all the apparatus of the senses.

Now the protection or defence of the body, with all the numberless laws of life, are set in motion in this manner. Therefore if the blood is thus compelled to retain its *carbon* or charcoal, blackness tinctures the whole skin, which is so characteristically demonstrated in the blue or leaden hue of the face and hands of the cholera patient. Yet should this black blood be taken from a vein in his body, and mixed with *certain neutral salts*, it instantly combines with oxygen, developes vital electricity, which strikes its red colour, and transforms it to life-giving arterial blood, humorously described in this couplet by Hudibras

> And, like a lobster boil'd the morn
> From black to red began to turn.

[This experiment was beautifully shown in Dr. Turley's second lecture on Thursday evening, by mixing some of Lamplough's combination of Stevens's artificial salines of the body with blood, previously washed in soft water, which takes out the natural salt.]

I must now give you a brief account of the living blood-pump, which we call the *heart*, though this *heart* must not be confounded with the *heart* of *life* of Moses, or the central spot in which the *spirit of life* resides in the solar plexus, in the cavity of the abdomen, for the blood pump is placed, as all know, in the chest, in the human subject, between the two lungs, and towards the left side. Now if you will consider this goblet to represent the living hollow heart, by the contraction of whose fibres its containing blood is pumped over the body, you will form a tolerable idea of the mechanism engaged in the circulation. Its muscular contraction is produced by a sudden supply of electricity from the cerebral nerves represented by this piece of *red* sealing wax (carrying positive or muscular electricity to the muscular fibres), and this piece of *blue* sealing wax (negative or vital,) representing the branches from the solar ganglion of life, which permeate and line the internal coat of the heart. Now the salts of the blood dissolved in its serum, or water, act upon the two electricities contained within the two cardiac nerves; an equilibrium takes place, and the shock is evinced by *one beat of the heart*, as we call it, precisely analogous to the electric shock excited in the ordinary galvanic trough by the sulphuric acid and water placed between the copper and zinc plates of this well-known machine. One charge of the heart's blood is thus advanced some inches on its road; its regurgitation into the same cavity is arrested by suitable valves. When the spasm of the muscular shock is over, the heart assumes its wonted dimensions, partly through its inherent elasticity and partly by the *musculi pectinati* and *cordiæ tendiniæ* within itself. By this arrangement of mere muscular force, excited by electricity, the heart's action can continue independently of the mind, during sleep or during the temporary suspension of life known as swooning or fainting.

Now, had Dr. Stevens only demonstrated this beautiful new fact, previously unknown, he would have ranked higher in the glory of science than the "immortal Harvey," who merely discovered the *course*, but not the *cause*, of the circulation of the blood. It is well known to our distinguished physician, Dr. Malden, and to several other medical men here, that Dr. Stevens maintained the action of the rabbit's heart, when removed from the body, for eleven hours, as perfect in its pulsation as it was in its original possessor's body. It may suggest itself to many of my lady auditors that various emotions of their *sensitive minds*, can disturb, by palpitation, this truth-telling metronome, but their objections to my view will be removed when they reflect that every emotion of their souls can, by the vital telegraphs, actuate the heart's branches of the vital nerves; and when they next blush, herein is the problem solved. You will now, I am sure, kindly forgive my almost adoration of the above much misunderstood philosopher, when I tell you he has been and continues to be, the source of most of these beautiful views which it has been my felicity to develop before you this evening. Science will never cease to be indebted to the genius of this great man, who, employing it on a small island, shut out by distance from the rays of metropolitan science, was compelled to tread, unaided, the labyrinths of desert and forest, where civic pioneers had cleared the paths of science at home, so that, with the mind of a child as to its tools, his great genius worked its course under manifest disadvantages. In my many conversations with this philosophic man, I have often smiled at what appeared to me once as his flights of fancy, but now I have learned better to appreciate his intuitive grasp at the great principles of nature's laws.

After this long digression, into which I have been led by cordial admiration, and which I hope you will kindly forgive my having indulged in, I proceed to remind you that black, or carbonised blood, is inimical to life, through its want of oxygen, the *parent* of electricity. You will now apply these facts to your own reasoning powers, as the sole cause of Choleraic death, namely, the *presence* of the deadly carbon, and the *absence* of the natural salts, in what should be the living blood, and the still more fatal *arrest* of the galvanic contraction of the heart, on which life depends by *draining off* through the excreting surface of the bowels the *vital electric salts* from the serum of the blood, by which means the electric strokes, or pulsations of the heart, *cease* altogether.

To recapitulate:—In considering the noxious nature of cholera, we conclude that this self generating living poison is carried into the lungs by means of the air we breathe; hence disseminated throughout the body by the action of the heart; then inflicting its pestilential effects on the vital nerves, disturbing the electric equilibrium of the cerebral and spinal current, which produces the well-known cramps and spasms in this disease. The intuitive knowledge of life, becoming conscious of the dangerous enemy percolating its body, seeks, through the aid of the internal nervous surface of the intestinal tube, to pour fourth the poison dissolved in the serum of the blood, but unhappily for the progress of life, it separates at the same time, in the same fluid, the salts essential to the vital electricity, which stimulate the muscles of the heart to beat. The remaining blood in the body thus unvitalised becomes *black*, *thick*, and *vapid*, and no longer contains the stimulus to life.

[It would be impossible to convey to the public in this form, without the aid of engravings from the drawings exhibited, and a repetition of the experiments made, an adequate conception of the pleasing and erudite information the Lecturer conveyed.]

Now, although by this time you may have acquired some knowledge of the operations of life, a farther elucidation of the *spiritual nature* of man is required by you, and this we will endeavour to confine our attention

to in the contemplation of the characteristic differences betwixt a living body and a lifeless corpse. What is the actual nature of a dead human body, at the sight of which all living humanity shudders? It still possesses all the *corporeal* elements of man; in what, then, I ask, does it differ from living man? It manifestly possesses all the elements of his nature save those spiritual *addenda* which the Almighty granted him when He created him in His own image. "In the likeness of God created he him."

"For 'tis a sight
Of wonder to behold, the body and the soul!
The self-same lineaments are there,
The same semblances of identity,
Yet how different! the one aspires to heaven,
Pants for its sempiternal heritage,
And wantons in endless being.
The body for a time, the unwilling sport
Of circumstance and passion, struggles on;
Fleets through its sad duration rapidly;
Then, like an useless and worn out machine
Rots, perishes, and passes."

What, then, are these spiritual essences which constitute man a living machine—a thinking reasoning creature—an inheritor of "Life Eternal?" These Godly gifts are *three*, with *one* physical essence, being their working agent—electricity:—the spirit of life, seated in the centre of the body (the lunar ganglion); the spirit of the mind, seated in the centre of the brain, with the five senses at command; and the *human soul*, placed in the tree of life, or solar plexus. These may be called the three spiritual essences of man; whilst the material, but inscrutable, essence—electricity, you will observe, is the sole *agent* of all creation, ministering to the volition of the three spiritual powers. It will, nevertheless, be borne in mind, that although electricity is an agent of life, it cannot *create*; the creative power cannot be supplied but by the will of God, nor can the human mind conceive the nature of the Almighty essence. It is shown, however, I trust satisfactorily, that although the four chemical elements enter largely into the constitution of animals; the vital power is God's, for now, as in the beginning, "the spirit of God moveth on the face of the waters."

We come now, thirdly, to the point which is most deserving our attention, in relation to the composition of the human body, formed as it is of "the dust of the earth." Some puny, grovelling atheists and materialists may sneer at this, and superciliously ask how could God make this earth from nothing? *Ex nihilo nihil fit.* Art thou aware that Davy has reduced carbonic gas to carbon, which Mr. Richards at your Gas Works daily performs for mercantile reward? Dost thou not know that Faraday has liquified the three other component gases of matter? Where then is thy imaginary fulcrum for overturning God's revealed Word? Where thy—

——————"baseless fabric of a vision,
Which leaves not a wrack behind."

Nothing, in my opinion, is more gratifying to the philosophic or truth-moving mind, than to be enabled, from contemplation of the works of material creation, to trace the relation existing between the actual works and the "revealed Word," for the Word "became flesh, and dwelt among us," but "the darkness comprehended it not."

[Dr. Turley here exhibited a specimen of pure carbon, from the Gas Works in this city, the result of the condensation by heat and pressure in the retort, which, as he stated, would be diamond if any one would kindly crystallise it.]

Now, if such operations can be effected by science, can you not apprehend the Almighty calling on the four *gaseous* elements to form the *matter* of a globe? Still the condensation of these four gases could be but dead

matter, without it had pleased the Almighty to lend to it a given portion of His own inscrutable vitality—to wit, the three spiritual essences previously considered.

Is it not, I would ask, a grand and most ennobling idea, that out of so few and so simple materials the Almighty formed this beauteous world of ours, with its teeming myriads of living creatures—their economies prefixed, by the instruction of their nervous systems (which great fact the Calvanists have misappropriated,) and its varied productions—and gave them all into the hands of man to have dominion over them, as his *material* food, but not *spiritual* food, mark ye, to be to him "for meat!" But as to the tree of knowledge of good and evil, (the mind,) He gave him no power to live on it, and this is as the Saviour alleged, the only unforgiven sin, the eating or corruption of the Word—the blasphemy against the Holy Spirit—the only unforgiven sin. The more you weigh this, and reflect upon it in your closets—in "your chambers" when ye are still, the more you will be enveloped in conviction of the truth of the Scriptural revelation. Now, if the human dust found, centuries after sepulture, in the leaden coffins, be submitted to chemical analysis, as Liebig, my old master did, you will find, as he has found, it to contain the same materials as the living body—*e.g.*, lime, silex, iron, phosphorus, sulphur, the salts of the blood, carbon, and in short all the four elements of matter, the same as the earth we walk on. On the verity of this conclusion, on which I pledge my honour, let me request the sceptic now to affirm "There is no God," "There is no Saviour," who has revealed His Father's will, nor any Comforter to support the disciple of the Word, or the seeker for life immortal. Let him henceforth hide his diminished head, and consider himself only created to be a living example of evil for the vital and eternal good of others.

You will have already anticipated, from the line of argument on this subject I have chosen to adopt before you, that the appetites or propensities of the three spiritual essences of our nature will be individually and distinctly dissimilar. For example, the essence of life will seek out of matter the elements whereon its body should be constructed and upheld. You will please to bear in mind that the first atom of the human cell is the first molecule extruded from the matrix of its parent, and this let me add in passing, is the secret, which I shall ultimately develope, of the laws of digestion. The *mental* appetite will be totally different to the vital appetite; it will through its five senses of sight, hearing, smell, taste, and feeling, seek, by its volition animating these to acquire food for reflection, imagination, and judgment by the surpassing gift of memory, so to retain in its storehouse the images of the things on which it has shed its luminating beams, and by its reasoning and individualising powers, to ruminate on these, and thus from two ideas to originate and perfect a third—a *tertium quid*. To the "life of the flesh," and to mental life, must be now added the life immortal. The facts of this subject must be self-evident to you, derived solely from the revealing spirit through its "word," or in other language, from the prophetic revelations of the Evangelists, contained in the Old and New Testaments. And all that it may be prudent here to say is, that the seat of the soul is in the tree of life in the centre of the body, where we feel its emotions, and its exalted appetite is verified in the words of the Saviour, who in his temptation said that "Man shall not live by bread alone, but by every word hat proceedeth out of the mouth of God."

Many persons may, however, remark, that all this is but a mere ingenious hypothesis, and say "we require proofs of the seat of the mind not being in the substance of the brain," for you must know that materialists have dared to identify brain and mind, stupidly believing that

the most insensate part of the body can generate immortal mind, foolishly converting the pure doctrines of phrenology into base materialism. Now, if I had not seen, as doubtless many of my professional brethren can testify, one hemisphere of the brain at one time converted into pus or matter, and at another hardened into coral tubes, or in a third instance its place occupied by water, and yet evidence of mind remaining, I should have been led into the same error as the members of the materialist school. In quadrupeds, as is known to our best physiologists, the brain can be wholly removed, provided the mental chamber remain intact, and yet the mutilated creatures retain volitional and rational endowments, evidences of even quadruped mind. The substance of the brain is therefore proved to be the most insensate part of the body; it has been sliced away in patients without their evincing pain. I have myself removed with a scalpel two ounces of brain from a boy's head without inducing pain. The explanation of this astounding fact is obvious, namely—not one of the nerves of sensation is sent to the brain. And why? Its function is chiefly to gather and to supply positive electricity, spent in the purposes of the mind, and in the locomotion and sensation of the body, by means of the muscular organs, the sensation of touch being conveyed to the mind in the head from the nerves of sensation, diffused over the whole cuticular covering of our bodies.

We may here remark that the two stimuli—heat and cold, have two distinct and opposite effects on the two component divisions of the three nervous systems. For instance, whilst heat exalts muscular and sensational action, cold rouses to action the vital power. I would like to ask any of my auditors here if faintness, which arises from exhausted vitality, overtook them, whether they would wish to be placed near the fire, or where the cold air from the window could blow on their bodies, and be applied to the vital nervous expansion lining the air cells of their lungs? Whether in such a state they would desire to have a glass of cold or hot water to revive them? Whether they would place their backs to the fire, or their faces to the breeze? Whether the directors of the Humane Society recommend cold or hot water to be splashed over the pit of the stomach in persons suffering suspended animation? The water-cure, (a false term,) whose quackery I amuse myself in ridiculing, has, beneath the surface of charlatanism, a deeper current of truth than its practitioners have dived into, or that was ever "dreamt of in their (tiny) philosophy," for their douche and packing practices call up, by the action of cold on the external skin, the energies of the internal ganglia, the sources of vital action. Hence the use of the cold and swimming bath, which, thanks to a stranger, are now established in Worcester.

But leaving the spirit of the life of the flesh and the operations of the mind where we have now placed them, we come to speak of the action of the soul, which always uses, even in common life, its own peculiar and emphatic language. It always claims for itself the dominion of the former two spirits, as well as the right of inheritance of its own body. For instance, the soul says—"I think with *my* mind," "I shall change *my* mind," "I see with *mine* eyes," "I do thus and thus with *my* hands;" and even the Almighty Himself, when conversing with Moses on Mount Horeb, when the Prophet doubted his own authority to dictate terms to Pharaoh, and the children of Israel, asked of Jehovah, who he might say had sent him, God answered "I AM THAT I AM," and directed him to say that I AM had sent him, thus demonstrating the first power, the "I am," the *ego*, which reigns supreme through all eternity. In this exposition, if I am not mistaken, the soul will be admitted to be the "I am" of God, placed in the human body, because it orders and wills every spiritual emotion dedicated to man.

It is now time, however, that I should proceed with the third head of my subject, and consider the respiratory organs of the lungs in the human body, as, from the consideration and examination of their construction, it will be at once seen how the spring of the system may be poisoned at its fountain. You see from this diagram of the lungs, greatly magnified by the microscope, that the lungs are composed of a great number of cells. These are analagous to the gills of fishes. The fish's gill consists of laminæ, or leaves, these being sub-divided into leafets, and these are re-divided into venous tufts. This structure is also represented by the leaf-lungs of the vegetable creation. The whole of these animal structures are gushed full of *venous blood* by each impulse of the right ventricle of the heart, or by the ocean wave, or river stream, their habitat; thus the blood, or sap, as it may be, according to the nature of the creature, is exposed to the oxygen either in the air or in the composition of the water. The respiratory surface in all animals, fishes, insects, and leaves is immense; for instance the gills of the common skate are equal in extent to four times the surface of an adult human body. A constant supply of oxygen is essentially necessary to vitality from the monad of the *infusoria*, to the biped of the *mammalia*, man. The main bulk of the human lungs consists of millions of air cells, and it is calculated that the internal surface of the adult human lungs contains a superficies of 20,000 square inches, 18,000 air cells being supposed to surround each terminal air tube, and their total number, contained in both lungs, could not, therefore, be less than 600,000,000—hence these unfolded would cover a space of 58 square yards, constituting the respiratory surface. Each air-cell is the hundredth part of an inch in diameter; so that it will be obvious that, whether we breathe pure, tainted, or pestilental air, this air is exposed to the blood engorging 58 superficial yards. Now, supposing soap bubbles to represent these air cells, you may readily imagine their hollow interior walls to be lined by a mucous membrane, blood vessels, and nerves, branches of the splancknic nerves, emanating from the lunar gangliæ, in juxta-position, and communicating with the solar plexus, or tree of life. You will well remember that I stated that the dark venous blood, rendered dark by the carbon it contains, is the refuse of the used-up blood—the charcoal of the gas retort—sent thither to be attracted from the body by the vital oxygen of the atmospheric air, and thus restored to its primitive function—the support of animal existence. At each inspiration the atmospheric air is drawn in, which is composed of twenty-one atoms of pure oxygen gas, and seventy-nine atoms of nitrogen gas. These gases are not united by chemical union, but, inasmuch, as their composing atoms are one larger than the other, and belong to positive, whilst carbon belongs to the negative pole, an electrical combination is philosophically induced betwixt the oxgen of the air and the carbon of the blood, and this electro-chemical compound, acidified by the oxygen, becomes *carbonic acid gas*, a *dead* gas, no longer useful, nay injurious, to every function of life. An ordinary man, with a full chest, can inhale a gallon of air, by an extra effort of respiration; but in ordinary respiration little more than a pint is taken in. A man of good size usually breathes eighteen times in a minute, so that eighteen pints of atmospheric air per minute is despoiled of its oxygen. In one day such a man consumes 26,000 pints, or about sixty hogsheads of atmospheric air, and a fourth part of the oxygen therein contained is converted into carbonic acid gas; hence eighteen gallons of air have altogether lost their life-sustaining power, and a new and deadly gas is exhaled. The conclusion will naturally follow that the respiration of many persons crowded into a small room, must create a noxious gas, inimical to each other's well-being. The blood of your bodies, a portion of which is now at the present moment in each of your toes, will

have made the circuit of your systems once, and will reach your toes again in two minutes and three-quarters. It first carried life to the extremities of the arteries, and thence it became the porter of death through the space betwixt the capillary veins and the expulsive air cells of the lungs. You may fancy, then, the aerial miasmata of Cholera, of scarlet fever, measles, small pox, and hooping-cough, borne on the wings of the atmospheric air, entering into the air bags of your lungs, and thence coursing the life channels, in their circuit, generating as they travel, and multiplying poison in every inch of their journey. A poison having the property of self-generation, like that of small-pox and scarlet fever, could readily, it will be hence seen, be circulated throughout the whole extent of the animal body. Some poisons, it will be remarked, like Cholera, scarlet fever, and small-pox, are self-generative, similar to yeast in a batch of bread, which leavens the whole mass in creating its likeness; whilst a few other poisons, such as those of the rattle-snake and hydrophobia, are not procreative in the human body. The time will arrive, and I opine at no very distant period, when the microscope and other means, shall demonstrate the physical differences of their component germinating atoms. I have long held an opinion that the physical nature ef even odours will be demonstrable; and a paper read at the late meeting of the British Association, at Liverpool, confirmed my prediction in this respect.

I cannot, perhaps, better fix on your minds the life supporting effects of oxygen than by referring to the chemical constitution of chloroform. It is composed of carbon, nitrogen, and chlorine; the absence of oxygen, therefore, constitutes this a dead, or non-vitalising gas, oxygen being essential to the working of the vital telegraph. The telegraph, thus deprived of its vital action, is no longer useful in conveying sensations to the mind for this simple reason, therefore no pain is felt by a patient, who has inhaled chloroform, when submitted to a surgical operation, because the mind can no longer receive the intelligence of the knife's deeds. I may as well in this place explain to you the essential duties of the electric salts of the blood, formed by digestion from the aliments with which we daily supply the stomach. These salts are principally common table salt (muriate of soda), carbonate of soda, phosphate of soda, carbonate of potass, chloride of potass, and phosphate of lime. These, by their presence and electrical interchanges, maintain the freshness of the blood, its arterial colour, and the chief vitalising properties of the fluid. They also enable the water of the blood to hold in solution the nutrient elements of the food necesssry for the growth and repair of the body. These elements are chiefly gelatine, albumen, fibrin, kreatinine, and casein. The salts of the blood, as I before stated, form the electric excitor of the two nervous poles, constituted by the grey and white matter composing the two distinct nervous structures, the one emanating from the cerebral battery, the other from the vital ganglion. It answers to the sulphuric acid and water employed in exciting electricity betwixt the copper and zinc plates composing the common galvanic battery.

I fear, however, that time, which I see by my watch, is rapidly hastening away, will not allow me to expatiate at any length on this interesting portion of the subject, but I must hurry on to speak of the poison of cholera, and its effects on the human system. It is a new animal poison, creating morbid phenomena dissimilar to any of those previously known to my profession. Hence the difficulties of which the public know but little that have obstructed the paths of the medical practitioner. There is a vague idea that it appeared for the *first* time in India in the year 1817; certain it is that in the Sunderbunds of Bengal it did in that year immense destruction of human and other life, and it has since then more than once circumgirated the world. This is now the third time it has visited our shores; and persists at present throughout the habitable globe.

I fear from this fact and from each advent being shorter than its predecessor, (the dates being 1832, 1849, and 1854), that we may soon have to class it among the naturalised diseases of this country.

Let us consider awhile what we actually know of its essence:—An ingenious Italian (Tomasini) has exposed sulphuric acid (POSITIVE) in watch glasses, which is known to rapidly absorb vapour, and found on analysis the acid greatly charged with carbonaceous matters (NEGATIVE). I doubt not that by means of the ozonometer, we shall ultimately be enabled to detect the presence of this new poison in the atmosphere.

[The various animal poisons were here commented on, and remarks made on the nature and properties of the alkaloids (NEGATIVE).]

Various of the animal poisons destroy the electricity of the blood, and to this category cholera miasma naturally belongs. Everyone knows the effect of chloroform. It can suspend and destroy animal and vegetable life. It can turn arterial into venous blood, and thus render the skin blue as in cholera, so that in the amputation of a limb I lately did, in presence of several surgeons here, I had great difficulty to ascertain whether I was ligaturing an artery or a vein. I may here remark that I cannot too strongly deprecate the indiscriminate use of this dangerous anodyne, for I have now 61 deaths on record, victims of chloroform.

You all know the asphyxiating effects of the Grotto del Cani in Italy, and the method the Boors adopt to resuscitate the suspended animation of the dogs they exhibit, namely, throwing a bucket of cold water over the apparently lifeless animal, which speedily recovers. To familiarly illustrate to you the injurious effect of the inhalation of noxious gasses, we will suppose a man going to a closed tub, previously unacquainted with its contents, which may be putrid wash for instance. He lifts the lid—applies his nose to telegraph to his mind the nature of its contents—inhales the odour—and—at once—starts back with strong expressions of loathing and disgust. He becomes sick. Why becomes he sick? You already know. He has inhaled the carburetted or sulphuretted mephitic gas, which, impinging on the vital nerves of the air cells in the lungs previously demonstrated, to be, as you well know by this time, only the telegraphs conveying knowledge to the seat of life and its instincts, falsely called "*sympathies*," (a word without an idea, like many others in school philosophy and old physic, which should be abolished for aye), the vital intelligence, our guardian angel, named self-preservation, commands instantaneous sickness, a new vital act. Now, if you will reflect, nobody can breathe while in the act of vomition; but reflect again and you find that the midriff, or diaphragm, being thrown into violent muscular contraction, this suddenly squeezes out all gasses contained in the lungs, thus arresting their noxious entry into the blood, the vital stream. So that you see a vital action, nick-named sympathy, means a deliberate volition, emanating from the spirit of life—the tutelary guardian of the body. Sneezing also has the same effect, and who has not enjoyed this salutary titillating convulsion, excepting perhaps the snuff-taker, who has, by a foolish habit, destroyed one of the finest—"sympathies" if you will—of the human economy.

I hold snuff-taking to be a pernicious practice, except for doctors and tallow-chandlers. (Laughter.)

We see in various ways how the spirit of life makes every effort she can command to remove, remedy, or alleviate, all noxious aggressors attacking her regal dominions. Now you know if a particle of sand falls into the eye, the first effect that announces its presence, is pain. The first effort made by the little "sperrit in the body," as my good friend Stevens Scottishly calls it, is to call upon its lachrymal gland to gush forth a flood of tears, seeking by this aqueous discharge to wash away the particle, and

to alleviate the pain occasioned by its presence. Thus the first action of the "little sperrit" is always intentionally curative, and herein you have an explanation of the salutary vomiting and diarrhœa, first set up when Choleraic poison permeates the vital channels of life.

This vital law is equally applicable to the *ingesta* of food, or the swallowing of poisonous medicines, for you are now prepared to know the essence of my original theory, namely, that no medicines act on the human body. Surely the world will think me mad to originate so revolutionary a dogma, and yet I will stake my reputation on the fact. Let me dissolve in this glass a grain of emetic tartar, and drink it. The liquid will scarcely have reached the intelligent telegraphic nerves of the stomach, emanating, as you will remember, from the station-house of life, before the guardian spirit will be conscious of the presence of an enemy on board, and will make an effort to neutralise his noxious intentions. Imagine, then, the conscious spirit calls upon the great water gland of the stomach—the pancreas, to drown the foe. Still his remains must not enter the blood. A council of war is held, and it is there determined that he shall be forthwith expelled the citadel. The Governor now gives command to use the means to eject the invader. The sluices are opened, (or the mouth and throat are filled with water,) and he is driven out by the act of emesis. But setting metaphor aside, let us ask what the stomach would do if dry oxymuriate of mercury were placed in it? Would the spirit of life then call on the pancreatic font for its aid? Certainly not; it would prefer to throw out behind the mucous membrane, on which the poison lay, albumen, or white of egg, which, as every chemist here knows, is the perfect antidote to the poison of the corrosive sublimate.

Let us now imagine that the third of a drop, the proper dose, of croton oil, be swallowed, what will the zoo-chemical council now determine? And now, in answering this question, we will weave in the knowledge we just now acquired of the method employed to issue from the body the poison of Cholera. The Choleraic poison was seen to be excreted from the serum of the blood vessels surrounding the mucous membrane of the stomach and bowels. The croton oil, being a highly-oxygenised oil, would, if it were attempted to be digested, injure the digestive nerves. It is therefore determined by "the powers that be," that this oil should be thoroughly washed out, and *hypercatharsis* is the well-known result, not by the nick-named action of the medicine on the body, but the vital action on the medicine by the zoo-chemical determination. So, you thus see, we have ridded physic of another of its bugbears or mysteries, the supposed action of medicines on the body. Can the dead tartar emetic, croton oil, or corrosive sublimate, ask the body to replace them into their proper bottles; or does the vital intelligence, inherent in life, determine its own annihilation of these missiles? You will determine, I feel assured, that it is the living body, therefore, which acts upon medicines, and that medicines cease to act when the hand that administered them is removed. If these premises be sound, the study of the young physician here commences—namely, to learn by experiment, as I have done with Majendie, on the living body, how it will behave when assailed, and, profiting by this knowledge, ingeniously to contrive to turn to account these excited exertions of the life's volition for the removal of our diseases. Dogs, none of whose race study physic, when they have engorged food that disagrees with them, will go to the first grass tuft, where the largest blades are to be found, and which you are aware will cut your fingers by their serrated edges, and swallow some of these, which, irritating the nerves of the stomach, without any chemical quality inherent in the grass, provoke the stomach to reject them. Now, let me ask, where is the medicinal quality of the grass which has provoked vomition, and relieved the poor animal of his inconvenient *ingesta?* Where is it? I leave old physic to demonstrate.

Now you all know that when in autumn the day draws in, and the nights and mornings become colder, the blood thereby is sent into the internal viscera of the body. The liver becomes engorged, the gall-bladder is pressed to empty itself, and biliary autumnal diarrhœa, antipodal to the Choleraic flux, results. Does the bile thus liberated *act* on the irritated intestinal mucous membrane; or do the living nerves, which alone can act, expel the noxious bile? These hints of true medical science will suffice my present purpose, though they be but a Lilliputian exhibition of the great laws which appertain to this new doctrine of my own.

[The molecular arrangement of the ganglionic primitive cells, previously referred to by the speaker, were re-described. The vital atom seemed to us to resemble the well-known seed of the spinach; while the positive, or cerebral atom, appeared circular, and lying together like marbles in a glass tube.]

You will now be prepared to consider another strange problem of mine—namely, *the mind never yet moved a muscle*, but the consentaneous life within us, through the electric communication by the vital splancknic nerves, attached to the spinal cord, and this to the sensational column, surrounding the mind's house in the centre of the brain, becomes the obedient servant of the mind's desire to have its muscles set in action. It has only to will a thing, and it is executed, with the celerity of lightning, for the speed at which electricity travels is 240,000 miles in a second of time! Who has not been wonderstricken with the sleight of hand practised by the Wizard of the North? In the present day we are all pretty well acquainted with the electric telegraph, and its wonders. But supposing a few years since an entire stranger to the matter had been told at the telegraph office in London—"Sir, the *Britannia* ship has just arrived at Liverpool, and is anchored in the harbour;" he would say—"Impossible; how can you know this?" The reply is—"Oh, I know it's true, for the news has just been brought along these wires." "Astonishing," says he, "what, do these wires talk then, or how know you this fact?" Then, light breaking in, he adds—"Oh, I suppose there is some one at the *other end* of the wires, sending you the intelligence." Precisely so is this the case with the electric telegraph of the human body. But let us imagine our sceptic not satisfied with the telegraph clerk's statement as to the invisible agent at the other end of his wire. He takes his finger and thumb, and runs down to Liverpool—(Laughter)—and there finds another clerk, to whom he is making hieroglyphic signs. The sceptic is now satisfied that the Liverpool mind is the directing power, the wire the agent of communication, and the London man the intelligent spirit, reading off the missions of the first *inceptor*. Now, let us suppose a novice in anatomy desiring to discover the seat of mind in its cerebral house. Would he not take the same method as did the telegraph sceptic? Would he not take the optic nerve, and trace it to the *corpora quadragemina* at the mind's doorway, and conclude that the mind must be inside, and which employs the eye to seek optical knowledge; or would he not take the auditory nerve, and trace it to the sensitive floor of the little mental porch—or, in anatomical language, to the fibres of the sensational cord, forming the

"Iter á tertio ad quartam ventriculam;"

and would he not hence conclude the mind can thus feel the dulcet sounds of music's harmony? Is there anything irrational in this hypothesis, which constitutes but one of the thousand wonders arising out of the confluence of mind and matter? Where, then, is the materialist's proof of brain being enabled to generate thought? As well might a brick generate a problem in Euclid! Where is the fitting place of such philosophers? On

their bellies shall they crawl—dust shall they eat to the end of their days, for mere dust-servers are they—dust they are, and to dust, as they deserve, shall they return!

But to return, for you will imagine I have forgetten the true object of my discourse—Cholera. And yet from experience I find it necessary to raise your minds by this epitome of mind, matter, and its laws, well knowing, by sad experience, that neither the public nor my profession can comprehend the living disease, Cholera, nor its simple antidotal treatment, till they are purged of the material philosophy and mystery which sullies and deforms the noble temple of medicine. The poison of Cholera, remember, is a living poison, like the yeast in a bread batch, and self generated. Its field of operation is the serum of the blood. Its first effects are felt by the vital nerves, which line the irrigating venous purlieus of the body. Their telegraphic and chemical power becomes arrested; the man at the telegraph in the office of life is now put to his wit's ends what to do. He commands the sluices to be thrown open, and the chylaqueous fluid is enormously ejected. In these few words you have an epitomical description of the hitherto mysterious unexplored labyrinth of the new Asiatic pestilence.

Now with regard to the

TREATMENT OF CHOLERA.

I begin by first deprecating the employment of opium, alcohol, lead, mercury, iron, antimony, arsenic, gold, bismuth, copper, silver, zinc, tin, jalap, camphor, colocynth, scammony, prussic acid, gallic acid, chloric acid, quinine, columba, canella, ginger, ether, chloroform, tobacco, cajuput oil, turpentine, capsicum, cardamums, kino, borax, lemon juice, lime water, charcoal, salicine, rheubarb, cinnamon, cannabinn, Indian hemp, colchicum, strychnine, crowfig, phosphorus, hartshorn, petrolium, castor and olive oil, cascarilla, aromatic confection, ipecacuanha, alum, asafœtida, black pepper, tartar emetic, zhorabia, raisins, cochineal, tolu, storax, apple pie, and anchovy sauce; all of which, and 400 other means, have, and have had each their sapient advocates. Nor would I lose irretrievable time in faddling with death by homœopathic infinitesimal ghosts, myths, and globules. But lest I hit the maniacal fancies of the lunatic Hanemann too hard, let me pay him the respect to add, he can do no positive harm, but only a negative mischief. Now chloroform, ether, and the fixed acids, as well as the caustic alkalies, can positively blacken the blood and simulate cholera, an experiment which all of you may try on cow's blood, unmixed with these substances. A glance of these, with your previous knowledge of the non-action of the medicaments of physic, will prove to you how little reliance can be placed in any of the vaunted specifics hitherto blazoned forth upon the ears of a credulous, panic-stricken public, with a penury of knowledge and a paucity of reason! Rather than rely on any of these nostrums, better would it be for the patient to assuage his thirst with gallons of cold water, wrap himself in his blanket, and repose on his guardian angel, the ever vigilant watch in the house he lives in, to call forth his own defensive powers, in resisting the almost overwhelming aqueous discharge which nature always attempts to induce.

Let us say a few words on the first, and most generally administered poison, opium. Surely, I shall obtain a negation from you if I propose to half kill a man by a grain of opium every hour who is already half dead with the poison of cholera; and most of the other remedies may be dismissed with your similar condemnation. Remember the heart can be asphyxiated and all the secretions arrested by the poison of opium introduced into the living blood. Enough has already been said to disabuse your minds of credence in these phantoms of physic. You will bear in mind

that I have before laid it down as an axiom, that Cholera kills by carrying out of the blood its living electric salts. I now wish to fix on your mind this aphorism:—to restore the electric salts is to maintain the heart's life through the salutary turmoil of the extrusion of the living poison breeding in the blood. And surely I gain a winning gratitude from you to the originator of this *palma nobilis*, which, [*"Terrarum dominos evehit ad deos"*] for he must possess the glorious consciousness, the pride of every Englishman, of having done his duty.

"Palmam qui meruit ferat." If I have ever been disposed to condemn any member of my profession for his tardy credence in these views, let me here make the *amende honorable*, for it is fitting that I should confess my own faithlessness in the visionary views I used to call them of Stevens's doctrines, and I fear this benevolent man will have too much reason to charge me with literary larceny in the manner in which I have incorporated the flowers of his bouquet with my own thread, which merely holds them together. It may be interesting to you, Mr. Sheriff, ladies, and gentlemen, that I make known to you that Dr. Stevens is a member of a talented family at Port Glasgow, in Scotland; that he was early in life the demonstrator of anatomy in the celebrated school of Allan Burns, and made the dissections of the neck for his early celebrated work; that he distinguished himself by the daring operation of tying the iliac artery, thus saving the life of his patient. The fact of any one having dared to do this, I heard ridiculed in the lectures both of Lawrence and Sir Astley Cooper; yet the preparation of the parts after the death of the patient now stand labelled in the Museum of the College of Surgeons, a proud monument, of successfully combatting the hand of death. In like manner the first application of these very views I am now unfolding before you, was successfully tried on Waldemir Sholton, the present Danish Minister at the Queen's Court, who was suffering under yellow fever, and having the last fatal symptom upon him—the black vomit, which on analysis is only venous blood, deprived of its natural salts, poured from the vessels of the stomach in fruitless vomition, and rendered black by the acid gastric juice. Here simply carbonate of soda cured Sholton; and the King of Denmark well requited the physician for this noble act. You will here observe a great difference in nature's laws, for in yellow fever she pours forth the black poisoned blood, and not the chylaqueous serum which she discharges, containing the germinating poison of Cholera. How simple then must appear to your minds the rational and philosophic saline treatment of the new pestilence. You have first to ask yourselves what are the electric salts indispensable to the continuation of the vito-electric action of the heart. These you will find to be chiefly common salt—carbonate and phosphate of soda, with chlorate of potass. And here let me remark, that although carbonate of potass is found essential to muscular structure, it is not parted with in the Choleraic dejections; for, in fact, the muscles in cholera are not affected save by spasms, induced by the maddened and frightened vital nerves, irregularly calling them into action in the throes of its agony. These muscular convulsions cease immediately that the above salts are administered, either by the mouth or by the bowel, or by being injected into the veins.

Think not, Apollo, tutelary god of physic, that I am about to open the secrets of thy arcana, and annihilate the legitimate *honoraria* of the ill-paid physician. No such thing; for no Cholera patient severely afflicted can, as it is termed, "physic himself." The pain, agony, mental confusion, and depression, place him out of the pale of self-crontrol, and sound judgment, to enable him to conduct his own cure, though the means be at hand. But Mr. Lamplough, who has cleverly transferred Stevens's knowledge into his own pockets, has patented a beautiful vitalising and

most agreeable compound, which he has chemically contrived to make effervescent, and which we cannot now legally imitate. This lucky and erudite chemist has already made his fortune by this means, and cannot at present keep the manufacture of this antidote against Cholera on a pace equal to public demand.

[The speaker here drank off an inviting effervescing goblet of this beverage; and exhibited before his audience the natural salts of the blood, the same as were exhibited in the Crystal Palace in 1851.]

It is now the fitting place when, after having mentioned Lamplough's vital electric salts, I should state, for the benefit of the timid, this best preservative against Cholera, which is certainly in the most agreeable form, is in mixing a teaspoonful of the powder in a goblet of cold water, and drinking it at each meal, or on the accession of any bowel complaint. But should my poorer hearers not choose to pay 1s. 9d. for forty goblets of this refreshing compound, they will effect the same purpose by mixing together half a teaspoonful of common salt, a teaspoonful of carbonate of soda, and as much of the chloride of potass as the broad end of a teaspoon-handle would take up. Dissolve this in a goblet of water, and take it at meal hours, or *every hour*, should the premonitory diarrhœa overtake them, using only gruel, beef-tea, and milk-food, till the bowels are tranquillized. Thus is physic made easy; and be assured, ladies and gentlemen, whether in law, physic, or divinity, wherever there is *mystery* there is mischief, and where the mind is mysterious its ideas are assuredly perplexed. The time will come when popular knowledge will demand popular instruction, even from the physician; and woe be to him who withholds truth, for which an educated public will ever readily pay. When public knowledge is rife, charlatanry will hide itself in the "grave of all the Capulets," and "Othello's occupation will be gone."

I feel that I must now bring my remarks to a conclusion, though I have so much to say, and the subject is so important an one, that I would rather prefer your cheering presence for a day than for an hour. Time, the stuff that life is made of, fleets fast away, and the late hour (looking at his watch) reminds me that I must contract my remaining observations into the briefest shape. One great antidotal power that salt possesses over all narcotic poisons, the alkaloids I have previously mentioned, was tested on the premises of our well-known, intelligent, and respected veterinary surgeon here, who kindly provided the animals on which the following experiments were made:—A moderate-sized horse was poisoned with morphine, which, as you know, is the essential salt of opium, and when death seemed impending, Dr. Stevens injected several pints of salt-and-water into its veins. The horse speedily recovered. He then first injected a horse with a saline fluid, and then a large poisonous dose of morphine was found to be innocuous. He washed the vividly-beating rabbit's heart with a solution of the deadly *belladonna*, and also with opium. The heart ceased to beat. He laved away this poison with salt-and-water; the heart resumed its wonted action. The proverbially uninformed Indian immediately applies salt to the part wounded by the deadly fang of the venomous serpent, and into the tooth-print of the rabid dog; and even the poison *lyssa* is believed by them to yield to this their chief antidote, which they always carry about with them. The dart wound, poisoned with *wooararia*, is believed to become innocuous, if it can be immediately stuffed with salt; and I am not sure that the ravages of Cholera were not intensified among the poor Bengalese, by their privation by a wealthy, though feelingless mercantile company, which has imposed an almost prohibiting duty on this necessary aliment—table salt.

It seems passing strange—nay, it's wonderful, that any person who has disengorged the leech of its black blood by salt, and has noticed the scarlet

hue of this fluid when it flows into the salt usually placed on the leech-plate, and has remarked the scarlet hue struck by salt, can doubt its revivyfying power, or the *pabulum* of life it stimulates. The pork-butcher practically knows its value; if he comes to kill a pig, he says to cook—"Marm, are you going to make any black-puddings?" "Yes, to be sure." "Then you must give me a handful of salt." As the blood flows from the stuck pig, he gradually mixes in with a birchen whisk his salt. Each twig becomes laden with the fibrine of the blood. The scarlet hue is struck; the death of blood—coagulation—does not occur till the cook boils or bakes her puddings with the groats, herbs, and fat usually constituting those well-favoured edibles. So—

"Sal sapit omnia,"

and I may add—

"Redivivit omnia vitâ animalia."

To recapitulate. You will now leave this beautiful Assembly Room—an ornament to our city—with these facts most prominent in your minds. The Choleraic miasma is self-generating, infectious, and contagious to man and some domestic animals, by reason of the self-generating power and subtlety of its poison. It is drawn into the body through the lungs, for the stomach would, if it could receive it, as it does the poison of the rabid dog and rattlesnake, render it innoxious by its zoo-chemical power. But the vital force—our best guardian, struggles to defend strong persons against its influence. It is therefore the poor, the debauched, the over-worked, the inhabitant of the pestiferous, drainless, over-crowded hut, that chiefly become its victims; for, like all the *infusoria* or cryptogamous plants, a peculiar soil will best befit its germination. Those about the sick should therefore, by moderate nutritive food—by proper exercise in the healthy air, and freedom from mind-depressing anxieties—with assured faith, uphold themselves when Cholera may be rife. Yet, with all these means at command, although Stevens and others have to boast of 95 per cent. of cures under favourable circumstances, we cannot all escape this perhaps Providential scourge, which has decimated many localities.

In closing our acquaintance here this evening, let me only add, that if I shall have been the happy instrument of conveying to you some instruction and amusement, the memory of the pleasure you have extended to so late an hour, will long be gratefully impressed on my mind; and for the little trouble that the preparation of this discourse may have given me, I am more than amply rewarded in the frequent marks of your approbation.

Dr. Turley retired amidst warmly-expressed approbation.